April 10.

Rev. B. LLOYD, D. D., Provost T. C. D., President, in the Chair.

Rev. Charles William Wall, D. D., F. T. C. D., Robert William Smith, M. D., and William Armstrong, Esq., were elected Members of the Academy.

A paper was read "On a new variety of Alumn," by James Apjohn, M. D., M. R. I. A., Professor of Chemistry in the Royal College of Surgeons, Ireland.

This paper commenced with a brief description of the physical characters and chemical properties of the mineral in question, which was found about 600 miles to the north of the Cape of Good Hope, near Algoa Bay, where it occurs in strata whose aggregate thickness is about twenty feet. The specimen described is composed of transparent threads or fibres, exhibiting a beautiful silky lustre, and in appearance closely resembling satin-spar or the finer forms of amianthus. In taste, solubility in water, and other properties, it corresponded with ordinary alumn. It was also easily shown to contain sulphuric acid and alumina, but in addition it contained a base which, though precipitated like alumina by potash, was not redissolved by an excess of the alkali. This, upon examination, turned out to be protoxide of manganese. There was no alkali, but about one per cent. of sulphate of magnesia.

In the first attempt at effecting the analysis of the mineral it was found that alumen and protoxide of manganese could not be separated perfectly by potash, as some of the oxide was taken up by the alkali, while a considerable quantity of alumen was left behind with the oxide. The author explained a method of overcoming this difficulty, the particulars of which are given in detail in the paper. The fol-

lowing are the results—the numbers in column (2) being the quotients got by dividing those in column (1) by the respective atomic weights:

	(1)	(2)	(3)
Sulphuric Acid, . . .	32.79	.817	4.000
Alumina, ...	10.65	.414	2.026
Oxide of Manganese, .	7.33	.205	1.003
Sulphate of Magnesia, .	1.08		
Water of Crystallization,	48.15	5.350	26.315
	100		

The numbers in column (3) being almost exactly the integers, 4, 2, 1, and 26, show that the substance analyzed is a true alumn, having, as respects its acid and bases, the same formula

$$(3SO_3, Al_2O_3 + SO_3, MnO + 26HO)$$

with all the known species of that genus, and the same number of atoms of water with soda alumn. It differs from all those previously known in containing no alkali, this being replaced by protoxide of manganese. As an additional peculiarity Dr. A. observed that it did not appear susceptible of assuming the octohedral form.

The paper concluded with some remarks upon the probable existence of an alumn containing no metal but manganese, and upon certain difficulties in the doctrines of isomorphism, suggested by some of the varieties of this class of salts.

Captain Portlock brought under the notice of the Academy some peculiar habits of the Otus Brachyotos, or short-eared owl, lately observed by Captain Neely, whilst collecting for the Ordnance Survey of Ireland.

This species of the sub-genus otus being migratory, is much rarer than the otus vulgaris, or long-eared owl, and it differs from it in many striking respects, such as the small size of the elongated feathers, commonly called ears, which

in this species can only be discerned when the bird is living, and in its tendency to diurnal habits. But in the instance now recorded it exhibits other peculiarities of habit which afford a still more remarkable line of distinction. The point of Magilligan, forming the Derry side of the opening of Lough Foyle to the sea, is studded at its extremity with numerous sand hillocks, in which the rabbits burrow and the sheldrakes lay their eggs, as in other similar localities. But here a new occupant for the burrows of the rabbits appears in the otus brachyotos. These birds are regular in their autumnal appearance, and are seen to sit at the openings of the burrow-holes, and to run into them when disturbed.

Captain Portlock having directed further attention to the fact, and pointed out the necessity of guarding against any source of fallacy, the truth of the first statement was fully established, more than one having been shot on emerging from the holes, and another actually caught in a trap at the mouth of a hole when endeavouring to make his escape. This interesting fact naturally recalls to recollection the stria cunicularicis of America, described by Say; and Captain Portlock pointed out the great value of characteristic traits of habit in elucidating classification, and suggested the peculiar importance of those described in his paper, in affording a link of resemblance between the stria cunicularicis and the otus brachyotos, and thereby facilitating the determination of the true place, in natural classification, of the former, hitherto considered doubtful.

The Secretary communicated the substance of a paper "On the Conic Sections," by James Booth, Esq.

The methods hitherto adopted in deducing the central and focal properties of the conic sections, from arbitrary definitions having appeared to the author defective in geometrical elegance, he has endeavoured in this paper to derive

them from new definitions, of which the following may be considered the principal:

1. If two spheres be inscribed in a right cone touching the plane of a conic section, the points of contact are called *foci*.

2. The radical plane of these two "focal spheres" intersects the major axis in a point called the *centre*.

The property from which the definition of a focus here given is derived, although known for several years, has not been hitherto applied further than to show that this point is identical with the focus as usually defined.

By the help of the above definitions, and of the simplest elementary principles, the central and focal properties already known have been deduced, generally in one or two steps, and several new theorems have been likewise discovered in the development of the method.

A paper "On Fluorine," by G. J. Knox, Esq., and the Rev. Thomas Knox, was read by Dr. Apjohn.

The authors, having taken a summary view of all the researches on fluorine up to the date of the commencement of their experiments in April, 1836, proceeded to describe the vessels of fluor spar which they used in their first experiments, and exhibited those which were latterly found best adapted for examining the gas. These vessels were of fluor spar lapped with iron wire for the purpose of equalizing the temperature, so as to prevent the vessels from splitting on a sudden application of heat. In place of a flat cover for the vessels, fluor spar receivers were used, the cavities of which were filled with ground stoppers of the same material. On moving the receivers over the mouth of the vessel the stoppers fall in, and their places are occupied by the gaseous contents of the vessel. On the top of each of the vessels is placed a flat slab of fluor spar, which answers the purpose of a table, upon which the receivers of the gases

can be moved. On the slab are four small depressions, in which are placed the substances upon which the action of the gas is to be observed, and over which the receivers, when filled with the gas, can be slid. In opposite sides of these receivers are drilled holes, into which are fitted, air tight, clear crystals of fluor spar, through which the colour of any gas in the receiver may be distinctly observed. The vessels are supported on a stand over a lamp.

On heating pure fluoride of mercury in these vessels with dry chlorine they obtained a colourless gas, (as seen through the fluor,) having a heavy smell not pungent or irritating, and thereby easily distinguished from chlorine or hydrofluoric acid. When exposed to the air, it does not fume, as would be the case were the slightest trace of hydrofluoric acid present. The inside of the vessel is found coated with crystals of corrosive sublimate. The gas does not extinguish ignited phosphorus or red hot iron wire, and consequently is (as Sir H. Davy conjectured) a supporter of combustion. It detonates with hydrogen, forming hydrofluoric acid. Placed over water, the solution (if such) has all the properties of hydrofluoric acid, i. e. acts on glass, reddens litmus, and gives precipitates with lime and barytes. Placed over dry litmus and Brazil wood paper, the former is reddened, and the latter turned yellow; in no instance are they bleached. When a receiver of the gas is placed over wet glass, the glass is strongly acted upon; when the glass is carefully dried, the action is not so strong as before. When a small piece of dry glass is placed in a perforation in the interior of the receiver, the glass is acted upon, but not more so than when fluoride of mercury alone is in the vessel, from which they conclude that fluorine does not act on perfectly dry glass.

To ascertain the action of the gas on metals they found it necessary to try the separate effects of hydrofluoric acid, sublimed fluoride of mercury, and bichloride of mercury, in order to distinguish the action of fluorine from that due

to the vapour of these substances. For this purpose bismuth and palladium at a moderate heat, and gold at a high temperature, afforded distinguishing tests. To determine the relative attraction of fluorine for those metals upon which it does not act except at high temperatures, they used as positive poles of a battery of sixty pair of plates, moistened fluoride of lead, palladium, platinum, gold, and rhodium. The palladium and platinum were always acted upon, the gold occasionally, and the rhodium never; from which they suppose that fluorine might be obtained in an insulated state, by electrolyzing fluoride of lead in a tube of fluor spar, using rhodium as the positive pole.

They were unable to repeat M. Baudrimont's experiments in glass or fluor spar vessels. Supposing that the gas he obtained was an oxide of fluorine, they heated in a dry glass tube iodic acid and fluoride of mercury; supposing that since iodine decomposes fluoride of mercury, the oxygen and fluorine, being set free from their combinations with oppositely electrical bodies (iodine and mercury), would be in the most favourable condition for combining. On the application of a moderate heat a pale yellow vapour rose in the tube, which did not act on the glass, and bleached litmus.

Mr. Mallet read a paper "On an hitherto unobserved Structure discovered in certain Trap Rocks in the County of Galway."

The town of Galway is built upon a part of an immense trap dyke, which extends under the sea and to a considerable distance up Lough Corrib. Large excavations for a dock are now making in this rock at Galway, and afford a convenient opportunity of examining its structure. It separates the limestone on the east (which it tilts up) from the sienite of Cunnemara on the west, (which it overlies or mingles with.)

Many of both adjacent rocks are found in an altered state imbedded in the trap; which, with the filtering of the limestone, prove the deposition a true dyke.

The mass of the rock consists of greenstone, sp. gravity 2.87, of a dark green, but frequently veined and mixed with many other minerals.

In the centre of the exposed portion of the dyke rises a large vein of nearly white hornstone, presenting very interesting characters. It contains no imbedded minerals, and is homogeneous in structure, but with a lamellar or pseudo-crystalline arrangement. Its planes are vertical, and at its junction with the trap it is moulded to it, but not adherent, and appears to have been formed from rocks at a greater depth than the trap, and ejected through it. The minerals found imbedded in this trap rock are various; specimens have been obtained of mica, chlorite, felspar, albite, olivine, augite, amphibole, epidote, apatite, adularia, chalcedony, sulphate of lime, probably anhydrite, baryto-calcite, arragonite, calcareous spar, fluor spar, galena, iron pyrites, sometimes magnetic. Epidote is found also on Mutton Island.

The general mass of this trap rock possesses a hidden nodular structure, only developable by blasting. The nodules consist of precisely the same material as their matrix, and having the same cohesion, they cannot be detached by the hammer.

The nodules are from eighteen inches in diameter to the size of a nut; they are sometimes found pressed together in masses with flat sides, like bubbles. Crystals occurring at the surface of a nodule do not pass into the matrix, but are truncated thereby. In some cases the nodular structure is gradually obliterated, and the usual homogeneous one replaces it.

This nodular formation is essentially different from any hitherto described,—as the orbicular granite of Corsica and South of France, the onion stone of the causeway, &c.,

in which the nodule and the matrix are of different materials. The present structure would appear to have been produced by the ejection of the trap in a fluid state under the sea; masses of which, cooling in their passage, fell again into the liquid bed, and being enveloped, were heated nearly to the temperature of the mass, and so adhered without losing their outline. Where several fell together, and were exposed to subsequent pressure, they would present the flattened appearance before described; and when more deeply enveloped, and thus subjected to a higher temperature, the nodular structure would again vanish by their complete fusion.

It is even conceivable that the most capriciously varied parts of this and other trap rocks may owe their origin to the soldering together of nodules of heterogeneous matter, projected from different depths, or at different times, or subjected to successive coolings and heatings.

Professor Kane read a paper entitled "Researches on the Compounds derived from Pyroacetic Spirit." (Second Series.)

When dry chlorine gas is passed into pure mesitylene, $C_6 H_4$, muriatic acid is given off, and a compound body, solid, in white prismatic crystals, is formed, giving on analysis the formula $C_6 H_3 cl$. A yellow substance obtained by the action of iodine on nascent mesitylene, but in too small a quantity for analysis, is considered to be $C_6 H_3 I$.

When mesitylene is treated with nitric acid, copious red fumes are given off, and a very heavy thick fluid obtained; which gives on analysis the formula $C_6 H_4 O_2$. This fluid absorbs ammonia, and forms therewith a compound soluble in water, and giving with most metallic solutions insoluble precipitates.

If pure mesitic alcohol be heated with nitric acid, there is

a very violent reaction, and an explosive decomposition, if distillation be attempted; but by diluting with water a heavy fluid is produced, which gives, on analysis, unsatisfactory results, owing, in the first place, to its decomposing with an explosion when heated, and, secondly, to its being always mixed with some of the substance last described: the results obtained indicate, however, as very probable the formula $C_6 H_3 NO_4$.

To connect the above results, Professor Kane proposes to assume as radical the body $C_6 H_3$, to which he gives the name of pteleyl. Then

$C_6 H_4 = C_6 H_3 + H$. Hydruret of pteleyl or mesitylene.

$C_6 H_3 Cl = C_6 H_3 + Cl$. Chloride of pteleyl.

$C_6 H_3 I = C_6 H_3 + I$. Iodide of pteleyl.

$C_6 H_4 O_2 = C_6 H_3 O + HO$. Hydrated oxide of pteleyl, the aldehyd of the mesitic series.

$C_6 H_3 NO_4 = C_6 H_3 O + NO_3$. Hyponitrate of pteleyl.

The compound heavy liquid produced by the action of chlorine on mesitic alcohol, was found to differ but little from the description given by Liebig. Its formula, as given by Dr. Kane's analysis, is $C_6 H_3 O_2 Cl_2$; and by the action of bases it yields a metallic chloride, and a salt of a new acid named by Professor Kane *Pteleic Acid.* This has not yet been analyzed, but theory indicates for its composition the formula $C_6 H_3 O_4$.

By the action of permanganate of potash on mesitic alcohol, there is generated a neutral salt of potash containing an acid, to which is given the nameof the *Perpteleic,* whose salts generally decompose themselves with facility into carbonates, and a salt of another acid to which the name of the *Acetonic Acid* has been applied. The constitution of these last three acids remains yet to be fixed by other experiments, the author confining himself in the present paper to the suggestion of that view of their composition, which, in the absence of positive analyses, seems to him most likely to be true.

Professor Kane exhibited to the Academy a balance made by a German artist, having some peculiarities of construction and adjustment.

It was resolved, "that the Council be authorized, if they deem it expedient, to purchase Mr. Underwood's collection of Irish antiquities."

DONATIONS.

Flora Batava, Nos. 105, 106. By H. C. Van Hall. Presented by the Author.

History of the Presbyterian Church in Ireland. By J. Seaton Reid, D. D. Vol. 1. Presented by the Author.

Le Primer Report des Cases et Matters en Ley resolus et adiudges en Ley Courts del Roy en Ireland. Presented by the same.

Transactions of the Royal Society of Edinburgh, Vol. 13, Part II. Presented by the Society.

Memoirs of the Royal Astronomical Society, Vols. 8 and 9. Presented by the Society.

Philosophical Transactions of the Royal Society of London, 1836, Part II. Presented by the Society.

List of the Fellows of the Royal Society, 30th November, 1836. Presented by the same.

Address delivered at the Anniversary Meeting of the Royal Society, on Wednesday, November 30th, 1836, by His Royal Highness the Duke of Sussex, K. G., &c. &c. &c. the President. Presented by the same.

Supplement to the Account of the Rev. John Flamstead, First Astronomer Royal. By Francis Baily, Esq., F. R. S., &c. &c. &c. Presented by the Author.

General Charte dir Geographischen Verbreitung und des Ganges der Cholera, 1816—1837. By Emel Isensee. Presented by the Author.

Neues System zur Ubersicht der inneren Krankheiten des Menschen. By the same.

Transactions of the Cambridge Philosophical Society, Vol. 6, Part I. Presented by the Society.

A Catalogue of the Collection of British Quadrupeds and Birds, in the Museum of the Cambridge Philosophical Society. Presented by the Society.

Discussion of the Magnetical Observations made by Captain Back, R. N., during his late Arctic Expedition. By Samuel Hunter Christie, M. A., F. R. S., &c. Presented by the Author.

April 24.

Rev. B. LLOYD, D. D., Provost T. C. D., President, in the Chair.

Charles Graves, Esq., F. T. C. D., and Thomas Wise, Esq., M. P., were elected members of the Academy.

A paper was read by Professor Kane "On *Dumasine*, a new Fluid Substance isomeric with Camphor."

This fluid is obtained in very small quantity in the distillation of acetate of lime for preparing mesitic alcohol. It boils at 248°, is colourless, and of a powerful resinous smell. Its composition by analysis is $C_{10} H_8 O$. Thus:

	Experiments.	Theory.	
Carbon,	= 78,82	— 79,30	100,00
Hydrogen,	= 10,46	— 10,35	
Oxygen,	= 10,72	— 10,35	

The specific gravity of the vapour of this liquid was found to be 5,204, air being 1. The theoretical density from the formula above given, is 5,315, and one atom forms